

**SAF-RC-110**  
**100-H Burial Grounds Remaining Sites –**  
**Soil In-Process**  
**FINAL DATA PACKAGE**

**COMPLETE COPY OF DATA PACKAGE TO:**

Kathy Wendt H4-21      KW 11/25/13  
INITIAL/DATE

**COMMENTS:**

**SDG J02047      SAF-RC-110**

Rad only       Chem only      Rad & Chem

Complete      Partial

**Waste Site: 100-H-44 (ACL stockpile footprint)**

Analytical Data Package Prepared For  
**Washington Closure Hanford**

Radiochemical Analysis By  
**TestAmerica Inc**

*2800 G.W. Way, Richland Wa, 99354, (509)-375-3131.*

Assigned Laboratory Code: TARL

*Data Package Contains 20 Pages*

Report No.: **57847**

Results in this report relate only to the sample(s) analyzed.

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
J02047	RC-110	J1T5T2	J3K210412-1	M2J481AC	9M2J4810	3325032
		J1T5T3	J3K210412-2	M2J491AC	9M2J4910	3325032



THE LEADER IN ENVIRONMENTAL TESTING

## Certificate of Analysis

Washington Closure Hanford  
2620 Fermi Avenue  
Richland, WA 99354

November 22, 2013

Attention: Joan Kessner

SAF Number	:	RC-110
Date SDG Closed	:	November 22, 2013
Number of Samples	:	Two (2)
Sample Type	:	Soil
SDG Number	:	J02047
Data Deliverable	:	Quick Turn Metals / Summary

### CASE NARRATIVE

#### **I. Introduction**

On November 21, 2013, two soil samples were received at TestAmerica for analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Washington Closure Hanford (WCH) specific ID;

<u>WCH ID#</u>	<u>TARL ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
J1T5T2	M2J48	SOIL	11/21/13
J1T5T3	M2J49	SOIL	11/21/13

#### **II. Sample Receipt**

The samples were received in good condition and no anomalies were noted during check-in.

#### **III. Analytical Results/Methodology**

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors. The requested analyses were:

**ICP Metals**  
ICP Metals by method SW-846 6010A  
**Chemical Analysis**  
Hexavalent Chromium by EPA method 7196A

#### **IV. Quality Control**

SDG J02047 includes a minimum of one Laboratory Control Samples (LCS), one method (reagent) blank, a duplicate sample, matrix spike sample and a matrix spike duplicate sample. Any exceptions have been noted in the "Comments" section.

Washington Closure Hanford  
November 22, 2013

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Blanks and LCS are reported in mg/L units, other QC and sample results are reported in the same units.

#### V. Comments

##### **ICP Metals**

##### ICP Metals by method SW-846 6010A

One batch was analyzed for the samples with the standard metal request list.

##### Batch 3325040:

The LCS, batch blank, samples, sample duplicate, MS, MSD, ICB, ICV, CCB and CCV results are within contractual limits.

##### **Chemical Analysis**

##### Hexavalent Chromium by EPA method 7196A

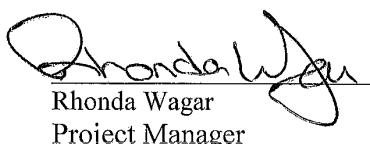
One batch was analyzed.

##### Batch 3325032:

The LCS, batch blank, samples, sample duplicate (J1T5T2) and sample matrix spike (J1T5T2) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the following signature.

Reviewed and approved:



Rhonda Wagar  
Project Manager

## Drinking Water Method Cross References

DRINKING WATER ASTM METHOD CROSS REFERENCES		
Referenced Method	Isotope(s)	TestAmerica Richland's SOP No.
EPA 901.1	Cs-134, I-131	RL-GAM-001
EPA 900.0	Alpha & Beta	RL-GPC-001
EPA 00-02	Gross Alpha (Coprecipitation)	RL-GPC-002
EPA 903.0	Total Alpha Radium (Ra-226)	RL-RA-002
EPA 903.1	Ra-226	RL-RA-001
EPA 904.0	Ra-228	RL-RA-001
EPA 905.0	Sr-89/90	RL-GPC-003
ASTM D5174	Uranium	RL-KPA-003
EPA 906.0	Tritium	RL-LSC-005

**Results in this report relate only to the sample(s) analyzed.**

### Uncertainty Estimation

TestAmerica Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship,  $R = \text{constants} * f(x,y,z,...)$ . The components ( $x,y,z$ ) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties ( $u_i$ ) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty ( $u_c$ ) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value ( $S/\sqrt{n}$ ), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

## Report Definitions

<b>Action Lev</b>	An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit.
<b>Batch</b>	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
<b>Bias</b>	Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30.
<b>COC No</b>	Chain of Custody Number assigned by the Client or TestAmerica.
<b>Count Error (#s)</b>	Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background.
<b>Total Uncert (#s) <math>u_c</math> - Combined Uncertainty.</b>	All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, $u_c$ the <i>combined uncertainty</i> . The uncertainty is absolute and in the same units as the result.
<b>(#s), Coverage Factor</b>	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
<b>CRDL (RL)</b>	Contractual Required Detection Limit as defined in the Client's Statement Of Work or TestAmerica "default" nominal detection limit. Often referred to the reporting level (RL)
<b>Lc</b>	Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. $Lc = (1.645 * \text{Sqrt}(2 * (\text{BkgrndCnt} / \text{BkgrndCntMin}) / \text{SCntMin})) * (\text{ConvFct} / (\text{Eff} * \text{Yld} * \text{Abn} * \text{Vol}) * \text{IngrFct})$ . For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero.
<b>Lot-Sample No</b>	The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot.
<b>MDC MDA</b>	Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. $MDC = (4.65 * \text{Sqrt}((\text{BkgrndCnt} / \text{BkgrndCntMin}) / \text{SCntMin}) + 2.71 / \text{SCntMin}) * (\text{ConvFct} / (\text{Eff} * \text{Yld} * \text{Abn} * \text{Vol}) * \text{IngrFct})$ . For LSC methods the batch blank is used as a measure of the background variability.
<b>Primary Detector</b>	The instrument identifier associated with the analysis of the sample aliquot.
<b>Ratio U-234/U-238</b>	The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038.
<b>Rst/MDC</b>	Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
<b>Rst/TotUcert</b>	Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
<b>Report DB No</b>	Sample Identifier used by the report system. The number is based upon the first five digits of the <b>Work Order Number</b> .
<b>RER</b>	The equation Replicate Error Ratio = $(S-D)/[\sqrt{TPUs^2 + TPUsd^2}]$ as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUsd is the total uncertainty of the duplicate sample.
<b>SDG</b>	Sample Delivery Group Number assigned by the Client or assigned by TestAmerica upon sample receipt.
<b>Sum Rpt Alpha Spec Rst(s)</b>	The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units.
<b>Work Order</b>	The LIMS software assign test specific identifier.
<b>Yield</b>	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.

**Sample Results Summary**

Date: 22-Nov-13

**TestAmerica Inc TARL**

Ordered by Method, Batch No., Client Sample ID.

**Report No. : 57847****SDG No: J02047**

Batch	Client Id Work Order	Parameter	Result +/- Uncertainty ( 2s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
<b>3325032 7196_CR6</b>									
<b>J1T5T2</b>									
M2J481AC	HEXCHROME	1.55E-01	+/- 0.0E+00	U	mg/kg	N/A	1.55E-01	1.55E-01	
M2J481AM	HEXCHROME	1.55E-01	+/- 0.0E+00	U	mg/kg	N/A	1.55E-01	1.55E-01	0.0
<b>J1T5T3</b>									
M2J491AC	HEXCHROME	1.55E-01	+/- 0.0E+00	U	mg/kg	N/A	1.55E-01	1.55E-01	
<b>No. of Results:</b> 3									

TestAmerica Inc	RPD - Relative Percent Difference.
rptSTLRchSaSum mary2 V5.2.25 A2002	U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

**QC Results Summary**  
**TestAmerica Inc TARL**  
 Ordered by Method, Batch No, QC Type,.

Date: 22-Nov-13

Report No. : 57847

SDG No.: J02047

Batch	Work Order	Parameter	Result +- Uncertainty ( 2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDL
<b>7196_CR6</b>									
3325032	MATRIX SPIKE, J1T5T2								
M2J481AL	HEXCHROME	2.46E+01	+- 0.0E+00		mg/kg	N/A	83%	-0.2	1.55E-01
3325032	LCS,								
M2J5T1AC	HEXCHROME	1.78E+01	+- 0.0E+00		mg/kg	N/A	93%	-0.1	1.55E-01
3325032	BLANK QC,								
M2J5T1AA	HEXCHROME	1.55E-01	+- 0.0E+00	U	mg/kg	N/A			1.55E-01
No. of Results: 3									

TestAmerica Inc	Bias - (Result/Expected)-1 as defined by ANSI N13.30.
rptSTLRchQcSum mary V5.2.25 A2002	U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

**FORM I**  
**SAMPLE RESULTS**

**Date:** 22-Nov-13

**Lab Name:** TestAmerica Inc  
**Lot-Sample No.:** J3K210412-1  
**Client Sample ID:** J1T5T2

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action_Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 3325032	7196_CR6				Work Order: M2J481AC		Report DB ID: 9M2J4810					
HEXCHROME	1.55E-01	U		0.0E+00	1.55E-01	mg/kg	N/A	1.	11/21/13 11:55 a	2.5024	g	

No. of Results: 1      Comments:

**FORM I**  
**SAMPLE RESULTS**

**Date:** 22-Nov-13

**Lab Name:** TestAmerica Inc  
**Lot-Sample No.:** J3K210412-2  
**Client Sample ID:** J1T5T3

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Action_Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rstt/MDL, Rstt/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 3325032	7196_CR6				Work Order: M2U491AC		Report DB ID: 9M2U4910					
HEXCHROME	1.55E-01	U		0.0E+00	1.55E-01	mg/kg	N/A	1.	11/21/13 11:55 a	2.5045	g	

**No. of Results:** 1    **Comments:**

**FORM II**

Date: 22-Nov-13

**DUPLICATE RESULTS**

**Lab Name:** TestAmerica Inc  
**Lot-Sample No.:** J3K210412-1  
**Client Sample ID:** J1T5T2

Parameter	Result, Orig Rst	Count	Total Uncert(2 s)	MDL, Action Lev	Rpt Unit, CRDL	Rst/MDL, Rst/TotUncert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 3325032	7196_CR6	Work Order: M2J481AM		Report DB ID: M2J481ER		Orig Sa DB ID: 9M2J4810				
HEXCHROME	1.55E-01	U	0.0E+00	1.55E-01	mg/kg	N/A	1.	11/21/13 11:55 a	2.5105	g
	1.55E-01	U	RPD 0.0	1.55E-01		N/A				

No. of Results: 1      Comments:

TestAmerica Inc      RPD - Relative Percent Difference.  
 rpiSTLRchDupV5.      MDCL|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.  
 2.25 A2002      U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the MDCL|MDA,Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

**FORM II**  
**BLANK RESULTS**

Date: 22-Nov-13

Lab Name: TestAmerica Inc  
 Matrix: SOIL

SDG: J02047  
 Report No. : 57847

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDL, Lc	Rpt Unit, CRDL	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 3325032	7196_CRF6			Work Order: M2J5T1AA 0.0E+00	M2J5T1AA 1.55E-01	mg/kg	Rpt DB ID: M2J5T1AB N/A	1.	11/21/13 11:55 a	2.5	
HEXCHROME	1.55E-01	U			1.55E-01		N/A	N/A		g	

No. of Results: 1      Comments:

**FORM II**  
**LCS RESULTS**

Date: 22-Nov-13

Lab Name: TestAmerica Inc  
 Matrix: SOll

SDG: J02047  
 Report No. : 57847

Parameter	Result	Qual	Count	Total	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 3325032	7196_CR6			Work Order: M2J5T1AC			Report DB ID: M2J5T1AS					
HEXCHROME	1.78E+01		0.0E+00	1.55E-01 mg/kg		N/A	1.90E+01		93%	1/12/13 11:55 a	2.5	g

No. of Results: 1      Comments:

**FORM II**  
**MATRIX SPIKE RESULTS**

Date: 22-Nov-13

Lab Name: TestAmerica Inc  
 Lot-Sample No.: J3K210412-1, J1T5T2

SDG: J02047  
 Report No. : 57847

Parameter	Spiker Result, Orig Rst	Count	Total Uncert(2 s)	MDCIMDA	Rpt Unit, CRDL	Yield	Rec- over	Expected, Uncert	Analysis, Prep Date	Aliquot Size	Analy Method, Primary Detector
Batch: 3325032	Work Order: M2J481AL		Report DB ID: M2J481CW		Orig Sa DB ID: 9M2J4810						
HEXCHROME	2.46E-01	0.0E+00	1.55E-01	mg/kg	N/A	83.13%	2.96E+01	11/21/13 11:55 a	2.5095	7196 CR6	
	1.55E-01									g	

Number of Results: 1

Comments:

TestAmerica Inc      RER      - Replicate Error Ratio =  $(S-D)/[\sqrt{(\sum(TPUs)+\sum(TPUs))}]$  as defined by ICPT BOA.  
 rptSTLRchMs      Bias      - (Result/Expected)-1 as defined by ANSI N13.30.  
 V5.2.25 A2002

SDG: J02047  
SAF: RC-110  
BATCH: 332504  
MATRIX: SOIL  
ANAYSIS DATE

TestAmerica Laboratories, Inc.

Client_Id	Matrix_Result_Case_nbr	Parameter	Result	Qualifier	Units	Reporting_Limits_Reported	Limits	Uncertainty_1s	Analyzed_s	AnalyzeDecision	Analysis_Level	lc	LCSTest_MetLab_Sample_id	Batch_nbr	Test_MetLab_Analysis_date_time
J117512	Soil_CS	7440-22-4	Ag	-1.4E-01	U	UGG	9.9E+00	4.6E-02	0.25	G	3.81E-02				11/21/2013 18:41
J117512	Soil_CS	7440-38-2	As	4.37E+00	U	UGG	9.9E+00	7.40E-01	0.25	G	6.11E-01				11/21/2013 18:41
J117512	Soil_CS	7440-39-3	Ba	6.91E+01	U	UGG	1.9E+00	1.39E-00	6.90E-01	0.25	G	5.69E-01			11/21/2013 18:41
J117512	Soil_CS	7440-43-7	Beryllium	2.31E-01	U	UGG	9.9E+02	9.9E+02	9.50E-03	0.25	G	7.79E-03			11/21/2013 18:41
J117512	Soil_CS	7440-43-7	Cadmium	2.07E-01	U	UGG	1.99E+00	1.99E+00	3.90E-02	0.25	G	3.20E-02			11/21/2013 18:41
J117512	Soil_CS	7440-47-3	Chromium	1.01E+01	U	UGG	9.9E+00	9.9E+00	2.40E-01	0.25	G	2.00E-01			11/21/2013 18:41
J117512	Soil_CS	7440-39-2	Lead	1.48E+01	U	UGG	9.9E+00	9.9E+00	1.90E-01	0.25	G	1.07E-01			11/21/2013 18:41
J117512	Soil_CS	7782-49-2	Se	3.12E+01	U	UGG	9.9E+00	9.9E+00	4.60E-01	0.25	G	3.77E-01			11/21/2013 19:14
J117512	Soil_CS	7440-22-4	Ag	-1.84E+01	U	UGG	9.9E+00	9.94E+00	1.10E-01	0.25	G	9.43E-02			11/21/2013 19:14
J117512	Soil_CS	7440-38-2	As	4.74E+00	U	UGG	9.94E+00	9.94E+00	1.10E-01	0.25	G	6.86E-02			11/21/2013 19:14
J117512	Soil_CS	7440-39-3	Ba	7.83E+01	U	UGG	1.99E+00	1.99E+00	7.30E-01	0.25	G	5.98E-01			11/21/2013 19:14
J117512	Soil_CS	7440-41-7	Beryllium	2.90E+01	U	UGG	9.9E+02	9.9E+02	2.80E-02	0.25	G	2.28E-02			11/21/2013 19:14
J117512	Soil_CS	7440-43-9	Cadmium	2.01E+01	U	UGG	9.9E+00	1.99E+00	3.60E-02	0.25	G	3.00E-02			11/21/2013 19:14
J117512	Soil_CS	7440-47-3	Chromium	1.13E+01	U	UGG	9.9E+00	9.9E+00	1.90E-01	0.25	G	1.52E-01			11/21/2013 19:14
J117512	Soil_CS	7439-32-1	Lead	1.33E+01	U	UGG	9.9E+00	9.94E+00	1.20E-01	0.25	G	1.01E-01			11/21/2013 19:14
J117512	Soil_CS	7782-49-2	Se	5.02E+02	U	UGG	9.9E+00	9.94E+00	1.50E-01	0.25	G	1.25E-01			11/21/2013 19:14
J117512	Soil_CS	7440-22-4	Ag	8.64E+04	U	MGL	5.00E-02	5.00E-02	7.20E-04	0.2487	L	5.94E-04			11/21/2013 18:27
J117512	Soil_BLK	7440-38-2	As	3.16E+03	U	MGL	5.00E-02	5.00E-02	2.00E-03	0.2487	L	1.64E-03			11/21/2013 18:27
J117512	Soil_BLK	7440-39-3	Ba	7.54E+05	U	MGL	1.00E-02	1.00E-02	1.60E-05	0.2487	L	1.31E-05			11/21/2013 18:27
J117512	Soil_BLK	7440-41-7	Beryllium	1.78E+01	U	MGL	5.00E-04	5.00E-04	7.10E-05	0.2487	L	5.83E-05			11/21/2013 18:27
J117512	Soil_BLK	7440-43-9	Cadmium	2.66E+04	U	MGL	1.00E-02	1.00E-02	1.70E-04	0.2487	L	1.36E-04			11/21/2013 18:27
J117512	Soil_BLK	7440-47-3	Chromium	4.50E+04	U	MGL	5.00E-02	5.00E-02	7.60E-04	0.2487	L	6.29E-04			11/21/2013 18:27
J117512	Soil_BLK	7439-92-1	Lead	-5.36E+04	U	MGL	5.00E-02	5.00E-02	1.10E-03	0.2487	L	8.76E-04			11/21/2013 18:27
J117512	Soil_BLK	7782-49-2	Se	2.54E+03	U	MGL	5.00E-02	5.00E-02	2.20E-03	0.2487	L	1.81E-03			11/21/2013 18:27
J117512	Soil_CS	7440-22-4	Ag	1.00E+00	U	MGL	5.00E-02	5.00E-02	2.20E-03	0.2487	L	1.80E-03			11/21/2013 18:31
J117512	Soil_CS	7440-38-2	Ba	9.32E+01	U	MGL	5.00E-02	5.00E-02	3.20E-03	0.2487	L	2.05E-03			11/21/2013 18:31
J117512	Soil_CS	7782-39-3	Ba	9.68E+01	U	MGL	1.00E-02	1.00E-02	2.70E-02	0.2487	L	2.18E-02			11/21/2013 18:31
J117512	Soil_CS	7440-41-7	Beryllium	1.33E+01	U	MGL	5.00E-04	5.00E-04	8.00E-03	0.2487	L	6.59E-03			11/21/2013 18:31
J117512	Soil_CS	7440-43-9	Cadmium	9.30E+01	U	MGL	1.00E-02	1.00E-02	2.40E-03	0.2487	L	1.94E-03			11/21/2013 18:31
J117512	Soil_CS	7782-49-2	Se	2.54E+03	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2487	L	9.04E-03			11/21/2013 18:31
J117512	Soil_CS	7440-22-4	Ag	1.00E+00	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2487	L	4.81E-03			11/21/2013 18:31
J117512	Soil_CS	7440-38-2	Ba	9.32E+01	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2487	L	5.80E-03			11/21/2013 18:31
J117512	Soil_CS	7782-39-3	Ba	9.68E+01	U	MGL	1.00E-01	1.00E-01	2.10E-01	0.2487	L	1.69E-01			11/21/2013 18:31
J117512	Soil_CS	7440-41-7	Beryllium	1.33E+01	U	MGL	1.00E-01	1.00E-01	6.20E-01	0.2487	L	5.10E-01			11/21/2013 18:31
J117512	Soil_CS	7440-43-9	Cadmium	9.30E+01	U	MGL	2.00E+00	2.00E+00	4.20E-01	0.2486	G	1.28E-01			11/21/2013 18:31
J117512	Soil_CS	7782-49-2	Se	2.54E+03	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7440-22-4	Ag	1.00E+00	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7440-38-2	Ba	9.32E+01	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7782-39-3	Ba	9.68E+01	U	MGL	1.00E-01	1.00E-01	2.10E-01	0.2486	G	1.69E-01			11/21/2013 18:31
J117512	Soil_CS	7440-41-7	Beryllium	1.33E+01	U	MGL	1.00E-01	1.00E-01	6.20E-01	0.2486	G	5.10E-01			11/21/2013 18:31
J117512	Soil_CS	7440-43-9	Cadmium	9.30E+01	U	MGL	2.00E+00	2.00E+00	4.20E-01	0.2486	G	1.28E-01			11/21/2013 18:31
J117512	Soil_CS	7782-49-2	Se	2.54E+03	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7440-22-4	Ag	1.00E+00	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7440-38-2	Ba	9.32E+01	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7782-39-3	Ba	9.68E+01	U	MGL	1.00E-01	1.00E-01	2.10E-01	0.2486	G	1.69E-01			11/21/2013 18:31
J117512	Soil_CS	7440-41-7	Beryllium	1.33E+01	U	MGL	1.00E-01	1.00E-01	6.20E-01	0.2486	G	5.10E-01			11/21/2013 18:31
J117512	Soil_CS	7440-43-9	Cadmium	9.30E+01	U	MGL	2.00E+00	2.00E+00	4.20E-01	0.2486	G	1.28E-01			11/21/2013 18:31
J117512	Soil_CS	7782-49-2	Se	2.54E+03	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7440-22-4	Ag	1.00E+00	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7440-38-2	Ba	9.32E+01	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7782-39-3	Ba	9.68E+01	U	MGL	1.00E-01	1.00E-01	2.10E-01	0.2486	G	1.69E-01			11/21/2013 18:31
J117512	Soil_CS	7440-41-7	Beryllium	1.33E+01	U	MGL	1.00E-01	1.00E-01	6.20E-01	0.2486	G	5.10E-01			11/21/2013 18:31
J117512	Soil_CS	7440-43-9	Cadmium	9.30E+01	U	MGL	2.00E+00	2.00E+00	4.20E-01	0.2486	G	1.28E-01			11/21/2013 18:31
J117512	Soil_CS	7782-49-2	Se	2.54E+03	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7440-22-4	Ag	1.00E+00	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7440-38-2	Ba	9.32E+01	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7782-39-3	Ba	9.68E+01	U	MGL	1.00E-01	1.00E-01	2.10E-01	0.2486	G	1.69E-01			11/21/2013 18:31
J117512	Soil_CS	7440-41-7	Beryllium	1.33E+01	U	MGL	1.00E-01	1.00E-01	6.20E-01	0.2486	G	5.10E-01			11/21/2013 18:31
J117512	Soil_CS	7440-43-9	Cadmium	9.30E+01	U	MGL	2.00E+00	2.00E+00	4.20E-01	0.2486	G	1.28E-01			11/21/2013 18:31
J117512	Soil_CS	7782-49-2	Se	2.54E+03	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7440-22-4	Ag	1.00E+00	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7440-38-2	Ba	9.32E+01	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7782-39-3	Ba	9.68E+01	U	MGL	1.00E-01	1.00E-01	2.10E-01	0.2486	G	1.69E-01			11/21/2013 18:31
J117512	Soil_CS	7440-41-7	Beryllium	1.33E+01	U	MGL	1.00E-01	1.00E-01	6.20E-01	0.2486	G	5.10E-01			11/21/2013 18:31
J117512	Soil_CS	7440-43-9	Cadmium	9.30E+01	U	MGL	2.00E+00	2.00E+00	4.20E-01	0.2486	G	1.28E-01			11/21/2013 18:31
J117512	Soil_CS	7782-49-2	Se	2.54E+03	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7440-22-4	Ag	1.00E+00	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7440-38-2	Ba	9.32E+01	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21/2013 18:31
J117512	Soil_CS	7782-39-3	Ba	9.68E+01	U	MGL	1.00E-01	1.00E-01	2.10E-01	0.2486	G	1.69E-01			11/21/2013 18:31
J117512	Soil_CS	7440-41-7	Beryllium	1.33E+01	U	MGL	1.00E-01	1.00E-01	6.20E-01	0.2486	G	5.10E-01			11/21/2013 18:31
J117512	Soil_CS	7440-43-9	Cadmium	9.30E+01	U	MGL	2.00E+00	2.00E+00	4.20E-01	0.2486	G	1.28E-01			11/21/2013 18:31
J117512	Soil_CS	7782-49-2	Se	2.54E+03	U	MGL	5.00E-02	5.00E-02	5.00E-02	0.2486	G	3.2520E-03			11/21

204/12/13

**Richland Laboratory**  
**Data Review Check List**  
**Hexavalent Chromium**

Batch Number(s):	3325032	Lab Sample Numbers or SDG:	J02047		
Method/Test/Parameter: Cr+6 <input type="checkbox"/> RL-WC-003(Aqueous) <input checked="" type="checkbox"/> RL-WC-004(Solid)					
Review Item	Yes (✓)	No (✗)	N/A (✗)	2 <sup>nd</sup> Level Review (✓)	
<b>A. Initial Calibration</b>					
1. Performed at required frequency with required number of levels?	✓			✓	
2. Correlation coefficient greater than 0.97?	✓			✓	
3. Initial calibration verification (ICV) analyzed immediately after calibration and results within 10% of expected?	✓			✓	
4. Initial calibration blank (ICB) analyzed immediately after ICV and concentrations of all parameters ≤ reporting limit?	✓			✓	
<b>B. Continuing Calibration</b>					
1. CCV analyzed at required frequency and all parameters within 10% of expected?	✓			✓	
2. CCB analyzed at required frequency and all results ≤ reporting limit?	✓			✓	
<b>C. Sample Analysis</b>				✓	✓
1. Were any samples with concentrations above the linear range diluted and reanalyzed?				✓	✓
2. Were all sample holding times met?	✓			✓	
<b>D. QC Samples</b>					
1. All results for the preparation blank below limits?	✓			✓	
2. LCS percent recovery within 85-115%	✓			✓	
3. PbCrO <sub>4</sub> percent recovery within 75-125%?	✓			✓	
4. Sample and Duplicate within 20% (aqueous) or 35% (solid) RPD?				✓	✓
5. MS or MS/MSD recoveries within 85-115% (aqueous) or 75-125% (solid)?	✓			✓	
6. On MS failure, PDMS within 85-115%?				✓	✓
<b>E. Other</b>				✓	✓
1. Are all nonconformances included and noted?				✓	✓
2. Is the correct date and time of analysis shown?	✓			✓	
3. Did the analyst sign and date the front page of the analytical run?	✓			✓	
4. Correct methodology used?	✓			✓	
5. Transcriptions checked?	✓			✓	
6. Calculations checked at minimum frequency?	✓			✓	
7. Units checked?	✓			✓	

Comments on any "No" response or list NCM number:

Analyst J. Salef Date 11/22/13 2<sup>nd</sup> Review J. Kahavi Date 11/22/13

**Lot No., Due Date:** J3K210412; 11/22/2013  
**Client, Site:** 127642; S00X235B00 HANFORD  
**QC Batch No., Method Test:** 3325040; M6010\_S 6010A  
**SDG, Matrix:** J02047; SOIL

#### 1.0 Initial Calibration

- 1.1 Performed at required frequency with required number of levels?  Yes  No  N/A  2nd
- 1.2 Correlation coefficient within QC limits?  Yes  No  N/A  2nd
- 1.3 Initial calibration verification (ICV) analyzed immediately after calibr. and results within QC limits of +/- 10% at 0.75 ppm?  Yes  No  N/A  2nd
- 1.4 ICB analyzed immediately after ICV and concentration of all parameters +/- report limit from zero? RL per RadCalc.  Yes  No  N/A  2nd

#### 2.0 Continuing Calibration

- 2.1 CCV analyzed at required frequency and all parameters within QC limits or +/- 10% at 0.7500 ppm?  Yes  No  N/A  2nd
- 2.2 CCB analyzed at required frequency and all results +/- reporting limit from zero?  Yes  No  N/A  2nd

#### 3.0 Sample Analysis

- 3.1 Were any samples with concentration above the linear range diluted and reanalyzed?  Yes  No  N/A  2nd
- 3.2 Were all sample holding times met?  Yes  No  N/A  2nd

#### 4.0 QC Samples

- 4.1 All results for the preparation blank < reporting limits?  Yes  No  N/A  2nd
- 4.2 MS or MS/MSD recoveries within 25% at 1 ppm and within 20% RPD (for MSD)?  Yes  No  N/A  2nd
- 4.3 LCS precent recovery within 20% at 1 ppm and 20% RPD (for LCSD)?  Yes  No  N/A  2nd
- 4.4 "ICP Only: Sample and DUP within 35% RPD?"  Yes  No  N/A  2nd
- 4.5 ICP only: One serial dilution performed and within 10% of parent per SDG?  Yes  No  N/A  2nd
- 4.6 ICP only: RLV run per batch and within 20% of current values?  Yes  No  N/A  2nd
- 4.7 ICP only: ICSA,ICSAB analyzed at the required frequencies and within 20% of values per dilution record?  Yes  No  N/A  2nd

#### 5.0 Other

- 5.1 Are all nonconformances included and noted?  Yes  No  N/A  2nd
- 5.2 Is the correct date and time of analysis shown?  Yes  No  N/A  2nd
- 5.3 Did the analyst sign and date the digestion log for the analytical run?  Yes  No  N/A  2nd
- 5.4 Correct methodology used?  Yes  No  N/A  2nd
- 5.5 Transcriptions checked?  Yes  No  N/A  2nd
- 5.6 Calculations checked at minimum frequency?  Yes  No  N/A  2nd
- 5.7 Units checked?  Yes  No  N/A  2nd
- 5.8 Verified that appropriate data transferred to ReportDB?  Yes  No  N/A  2nd

#### 6.0 Comments on any 'No' response:

First Level Philip Barth Date 11/22/13 Second Brenda Gel Date 11/22/2013  
 TestAmerica Richland  
 QAS\_RADCALCv4.8.58

Page 1



## Sample Check-in List

Date/Time Received:

11-21-13 / 1000 Container GM Screen Result: (Airlock) 100 cpm Initials B  
Sample GM Screen Result (Sample Receiving) 60 cpm Initials BClient: WCH SDG #: SD 204N SAF #: RC-110 NA [ ]Lot Number: J3K210412Chain of Custody #: RC-110-111Shipping Container ID or Air Bill Number: Grand L. Co. NA [ ]

Samples received inside shipping container/cooler/box

Yes  Continue with 1 through 4. Initial appropriate response.  
No  Go to 5, add comment to #16.

1. Custody Seals on shipping container intact? Yes [ ] No [ ] No Custody Seal   
 2. Custody Seals dated and signed? Yes [ ] No [ ] No Custody Seal   
 3. Cooler temperature: 0.9 °C Lcc NA [ ]  
 4. Vermiculite/packing materials is NA  Wet [ ] Dry [ ]

Item 5 through 16 for samples. Initial appropriate response.

5. Chain of Custody record present? Yes  No [ ]  
 6. Number of samples received (Each sample may contain multiple bottles): 2  
 7. Containers received: 44125mlp

8. Sample holding times exceeded? NA [ ] Yes [ ] No   
 9. Samples have: tape hazard labels  custody seals  appropriate sample labels  
 10. Matrix:  A (FLT, Wipe, Solid, Soil)  I (Water)  S (Air, Niosh 7400)  T (Biological, Ni-63)

11. Samples:  are in good condition  are leaking  are broken  
 have air bubbles (Only for samples requiring no head space)  Other \_\_\_\_\_

12. Sample pH appropriate for analysis requested Yes [ ] No [ ] NA   
 (If acidification is necessary go to pH area & document sample ID, initial pH, amount of HNO<sub>3</sub> added and pH after addition on table)  
 13. Were any anomalies identified in sample receipt? Yes [ ] No   
 14. Description of anomalies (include sample numbers): NA

15. Sample Location, Sample Collector Listed on COC? \* Yes  No [ ]  
 \*For documentation only. No corrective action needed.

16. Additional Information: W/1

 Client/Courier denied temperature check. Client/Courier unpack cooler.

Sample Check-in List completed by Sample Custodian:

Signature: Judie Stock Date: 11-21-13Client Notification needed? Yes [ ] No  Date: \_\_\_\_\_

By: \_\_\_\_\_

Person contacted: \_\_\_\_\_

 No action necessary; process as isProject Manager: Shando Weller Date: 11/21/13

Sample Preparation/Analysis										Balance Id:
										Pipet #:
										Sep1 DT/Tm Tech:
										Sep2 DT/Tm Tech:
										Prep Tech:
11/21/2013 11:46:47 AM	127642, Washington Closure Hanford LLC	DW Alkaline Digestion by method 3060A								
	Washington Closure Hanford LLC	EA Chromium, Hexavalent (7196A)								
<b>AnalyDueDate:</b> 11/22/2013	<b>51 CLIENT: HANFORD</b>									
<b>Batch:</b> 3325032	<b>SOIL</b>	<b>mg/kg</b>	<b>PM, Quote: RW2, 88144</b>							
SEQ Batch, Test: None	All Tests:	, 46DQ, 3325032 DWEA,								
Work Ord. Lot, Sample Date	Total Amt/Unit	Total Acidified/Unit	Initial Aliqout Amt/Unit	Adj Aliq Amt (Un-Acidified)	QC Tracer Prep Date	Tracer Yield	Dish Size	Ppt or Geometry	Count Time Min	Detector Id
										(24hr) Circle
										Count On Off
										CR Analyst, Init/Date
										Comments:
1 M2J48-1-AC										
J3K210412-1-SAMP										
11/20/2013 13:57										
2 M2J48-1-AL-S										
J3K210412-1-MS										
11/20/2013 13:57										
3 M2J48-1-AM-X										
J3K210412-1-DUP										
11/20/2013 13:57										
4 M2J48-1-AN-S										
J3K210412-1-MS										
11/20/2013 13:57										
5 M2J49-1-AC										
J3K210412-2-SAMP										
11/20/2013 14:02										
6 M2J5T-1-AA-B										
J3K210000-32-BLK										
11/21/2013 11:46 pd										
7 M2J5T-1-AC-C										
J3K210000-32-LCS										
11/21/2013 11:46 pd										
TestAmerica Richard Wa.	Key: In - Initial Amt, pd - Prep Dt, dc - Date Chg, r - Reference Dt, ec-Enrichment Cell, ct-Cocktailed Added		!SV - Insufficient Volume for Analysis		Page 1					WO Cnt: 7
										ICOC v4.8.49

